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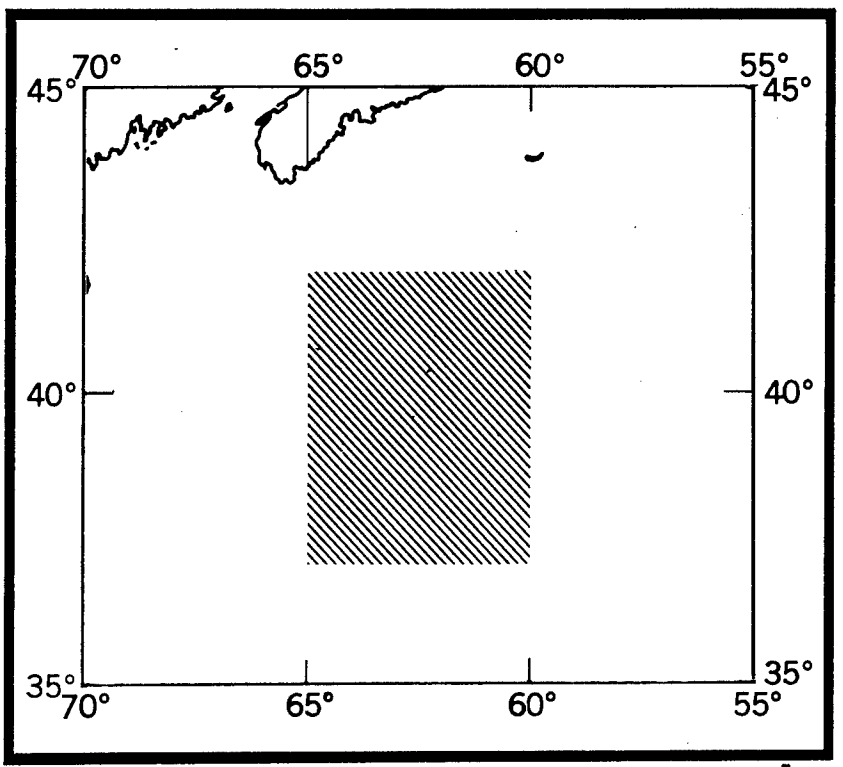
INFORMAL REPORT

OCEANOGRAPHIC CRUISE SUMMARY NORTH ATLANTIC OCEAN, EDGE OF GULF STREAM JULY-AUGUST 1968



DECEMBER 1968

NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D. C. 20390

INFORMAL REPORT

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ABSTRACT

This informal report is a summary of an oceanographic survey in an area 200 miles south of Nova Scotia during July and August 1968. Scientists from the Naval Oceanographic Office (NAVOCEANO) collected physical and chemical data aboard USNS LYNCH (T-AGOR 7).

Nansen stations were occupied and two expendable BT grids were accomplished. This data will be used in the investigation of volume transport, heat budget and advection along the northern boundary of the Gulf Stream.

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This report has been reviewed and is approved for release as an UNCLASSIFIED Informal Report.

B. C. BYRNES
Director, Developmental Surveys Division

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I. AREA

The locale of this survey includes part of the northern boundary of the Gulf Stream. The 55,000 square mile area is located about 200 miles south of Halifax, Nova Scotia. The rectangular area is bounded by latitudes 37° 30' N and 42° 00' N and longitudes 60° 30' and 65° 00' W.

II. OBJECTIVES

The study concentrated on the structure and rate-of-change in the meanders along the northern boundary of the Gulf Stream. The primary phenomena investigated were volume transport, heat budget, and advection. The data accumulated will also be used in the continuing evaluation of the Antisubmarine Warfare Environmental Prediction Services (ASWEPS) analysis model. All data collected were in support of NAVOCEANO ASWEPS project requirements.

III. NARRATIVE

The USNS LYNCH departed Little Creek, Virginia on 19 July 1968 with thirteen scientists from NAVOCEANO on board. The first phase of the operation was concluded on 4 August. After a personnel change in Halifax, Nova Scotia, the second phase began on 8 August. Operations were concluded on 18 August 1968.

IV. RESULTS

Twenty-five oceanographic stations were occupied during Phase I, 13 along the western edge and 12 along the eastern edge of the op-area (Fig. 1). In all, 512 serialized depth and temperature observations were recorded, and 512 salinity samples and 90 dissolved oxygen samples were collected and analyzed aboard ship. In addition, 162 phosphate, 162 nitrate and 19 silicate samples were collected and analyzed aboard ship. One STD station was occupied.

Two expendable SXBT grids (Figs. 2 and 3) were run in the op-area, one during Phase I and the other during Phase II. In addition, both mechanical and expendable BT's were taken at the oceanographic stations. SXBT's were also taken while crossing the continental slope when departing and returning to the Chesapeake Bay area. A total of 658 SXBT's and 48 mechanical were taken. During Phase I, 306 surface salinities were taken in conjunction with the SXBT's.

Table I provides a detailed listing of data collected on each consecutive oceanographic station in addition to the normal salinity and temperature measurements.

V. METHODS OF COLLECTION AND ANALYSIS

A. Physical Oceanography.

1. Temperature. Water temperatures were measured at selected depths by paired deep sea reversing thermometers attached to Nansen bottles. The accepted temperature values were obtained by applying standard corrections and averaging the two readings if the values differed by 0.05° C, or less. When paired thermometers differed by more than 0.05° C, the reading from the thermometer considered more reliable, based on its previous history, was used. Temperatures are considered accurate to ± 0.02° C. Cross sections of temperature data are shown in Figures 4 and 5.

2. Depth. Unprotected reversing thermometers paired with protected reversing thermometers were used to calculate thermometric depth values.

3. Bathythermographs. Standard 900' mechanical BT's were taken before and after each Nansen station. Expendable BT's to 1500' were taken hourly during the entire cruise. The nominal speed-of-advance (SOA) was planned to be 10 knots but the actual SOA varied from 8 to 15 knots due to currents either aiding or hindering the ship's movement.

B. Chemical Oceanography.

1. Salinity. Salinity samples were analyzed on board ship using a Bissett-Berman portable induction salinometer (Model 6220). This instrument is capable of determining salinities with a precision of ± 0.003 0/00. The salinometer was calibrated on board ship by analyzing samples of a known salinity. Salinity values presented in this report are considered accurate to ± 0.01 0/00. Cross-sections of salinity data are shown in Figures 6 and 7.

2. Dissolved Gases. Dissolved oxygen samples were analyzed using the Winkler (macro) method. Precision of the analyses was determined by a maximum permissable difference between duplicate runs of ± .03 ml/L.

3. Micronutrients. Samples for micronutrient analyses were drawn into six-ounce polyethylene bottles, quick-frozen, and stored in the ship's freezer until analyzed. They were analyzed

for reactive phosphorous and reactive silicates by the method of Strickland and Parsons in " A Manual of Sea Water Analyses", 1965. Nitrates were analyzed by the method of Wood, Armstrong, and Richards in " Journal of Marine Biological Association", U. K. , 1967.

VI. DISPOSITION OF DATA

The temperature, salinity, micronutrient, and dissolved oxygen data are on file at the National Oceanographic Data Center under cruise reference number 311257. The BT data are undergoing analysis by the Oceanographic Prediction Division, NAVOCEANO. A summary of the data obtained is given on the Field Data Summary Sheet for Oceanographic Surveys Department Operation No. 919006 (AGOR Cruise No. 076807).

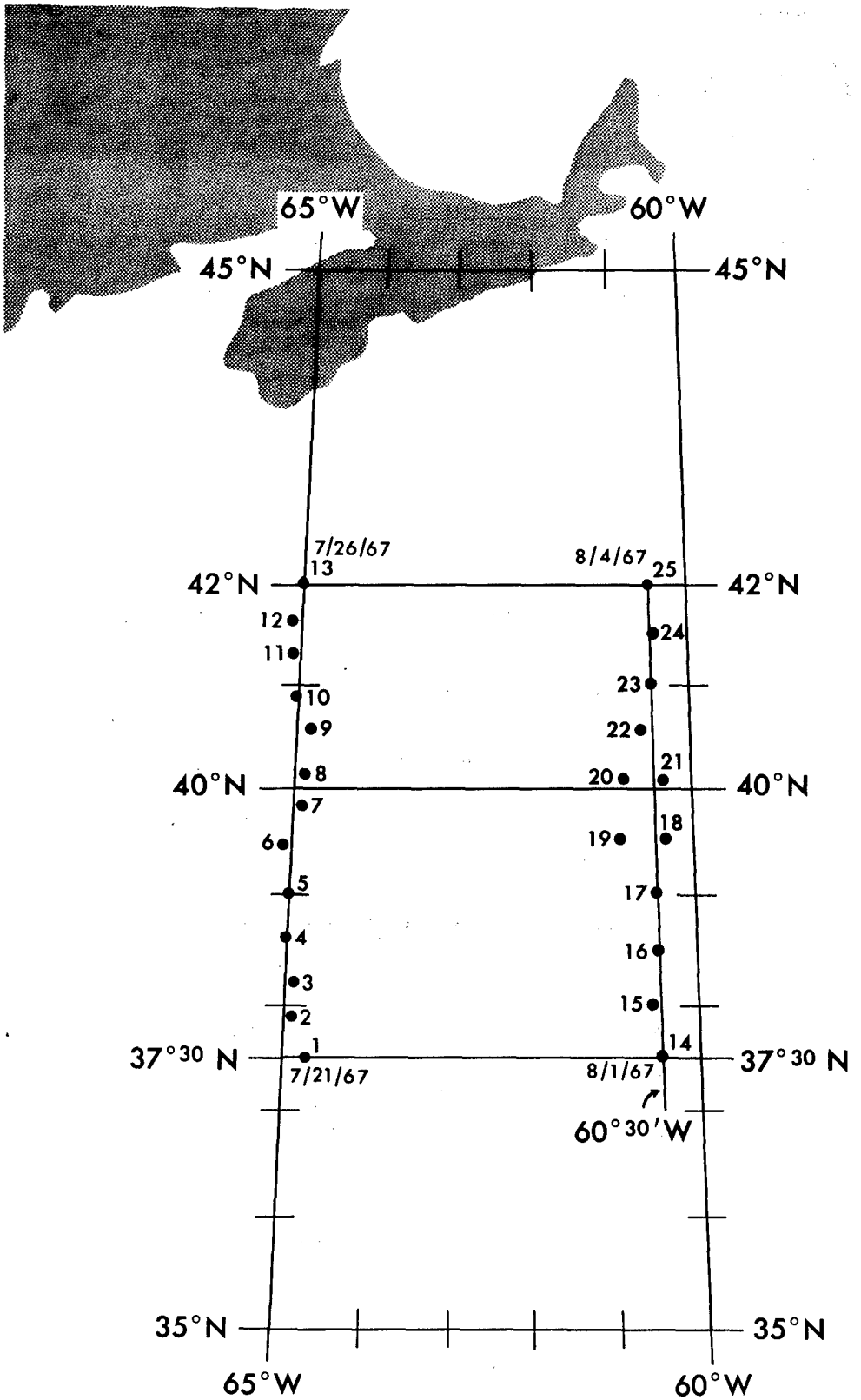

FIGURE 1 OCEANOGRAPHIC STATIONS

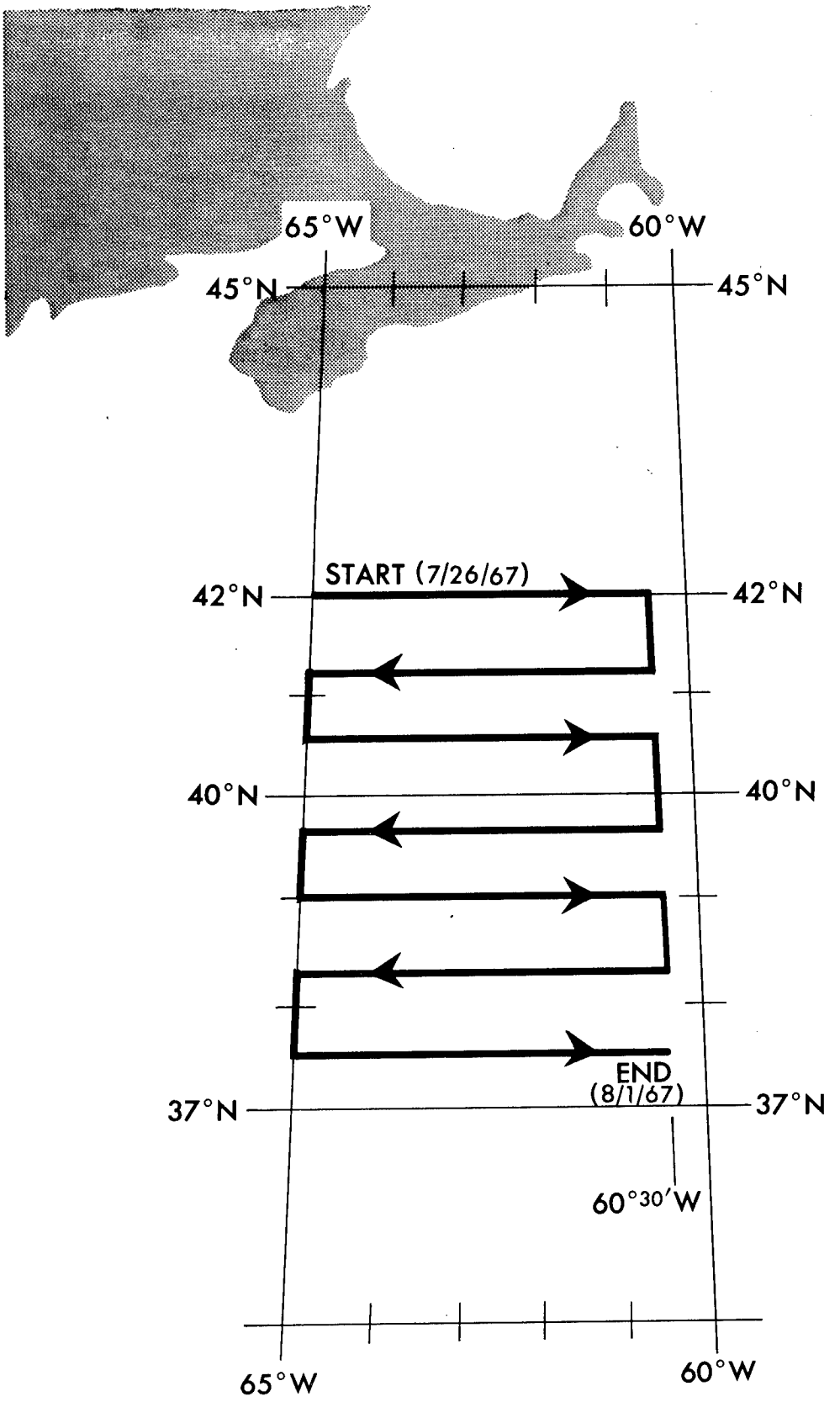

FIGURE 2 PHASE 1 BT GRID

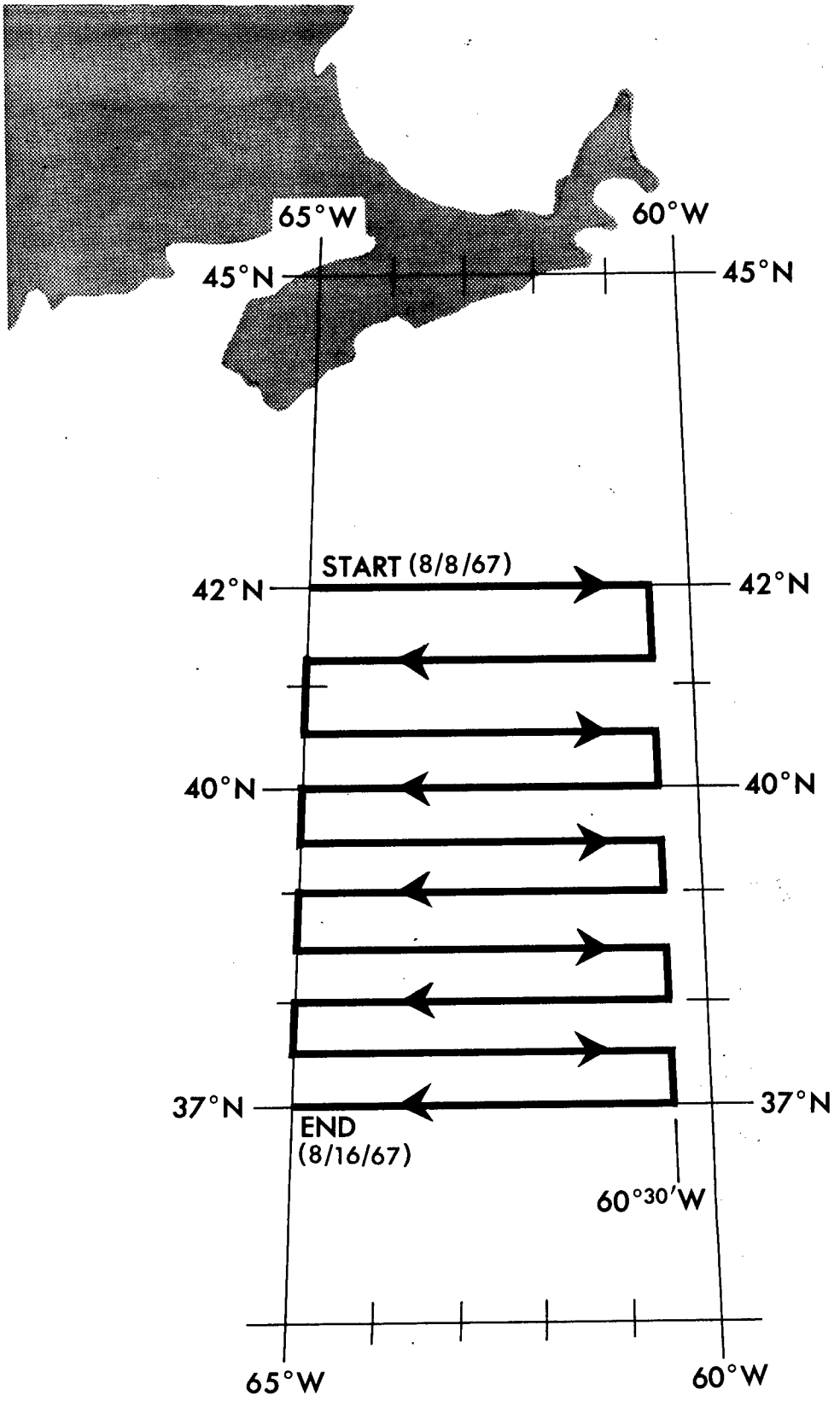

FIGURE 3 PHASE II BT GRID

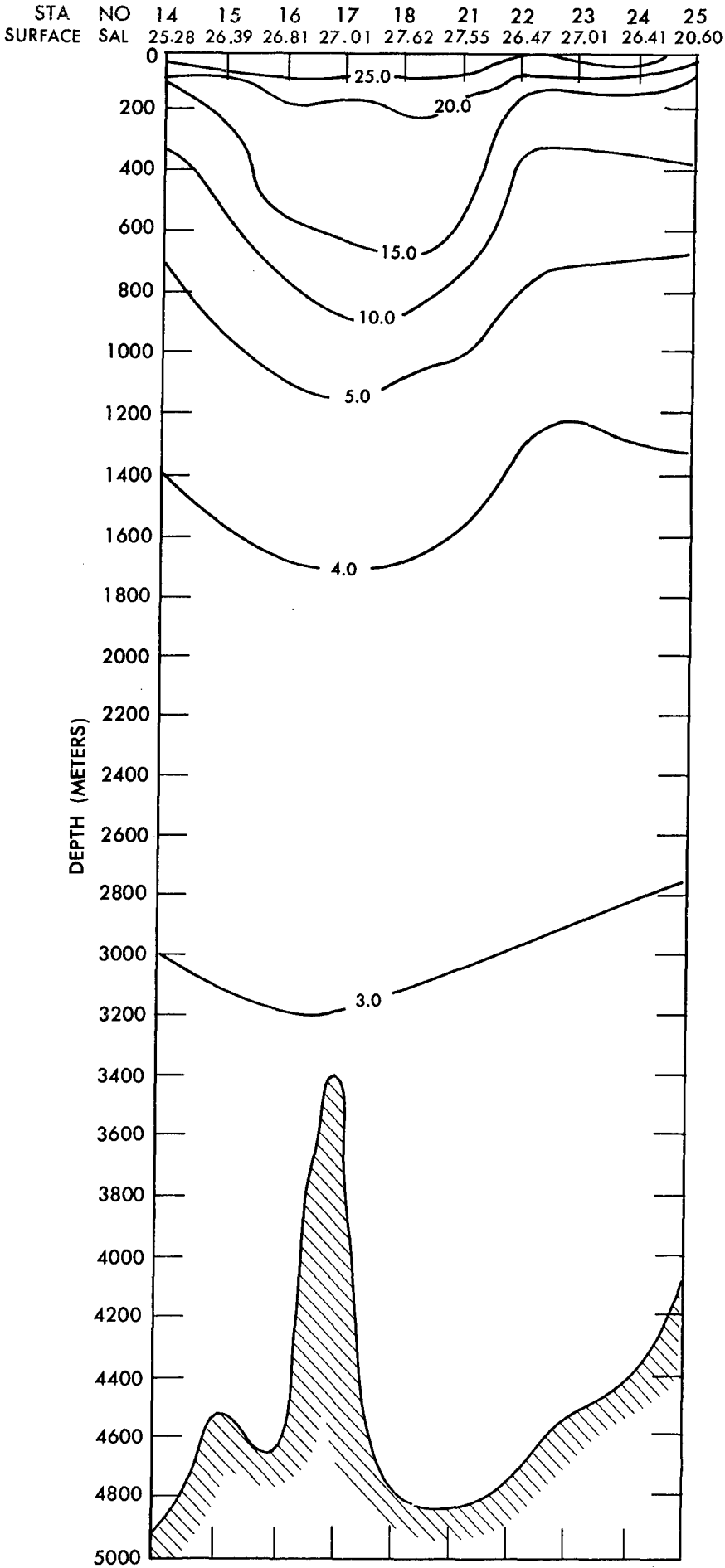

FIGURE 4 TEMPERATURE (°C) CROSS SECTION SOUTH TO NORTH 60°30'W

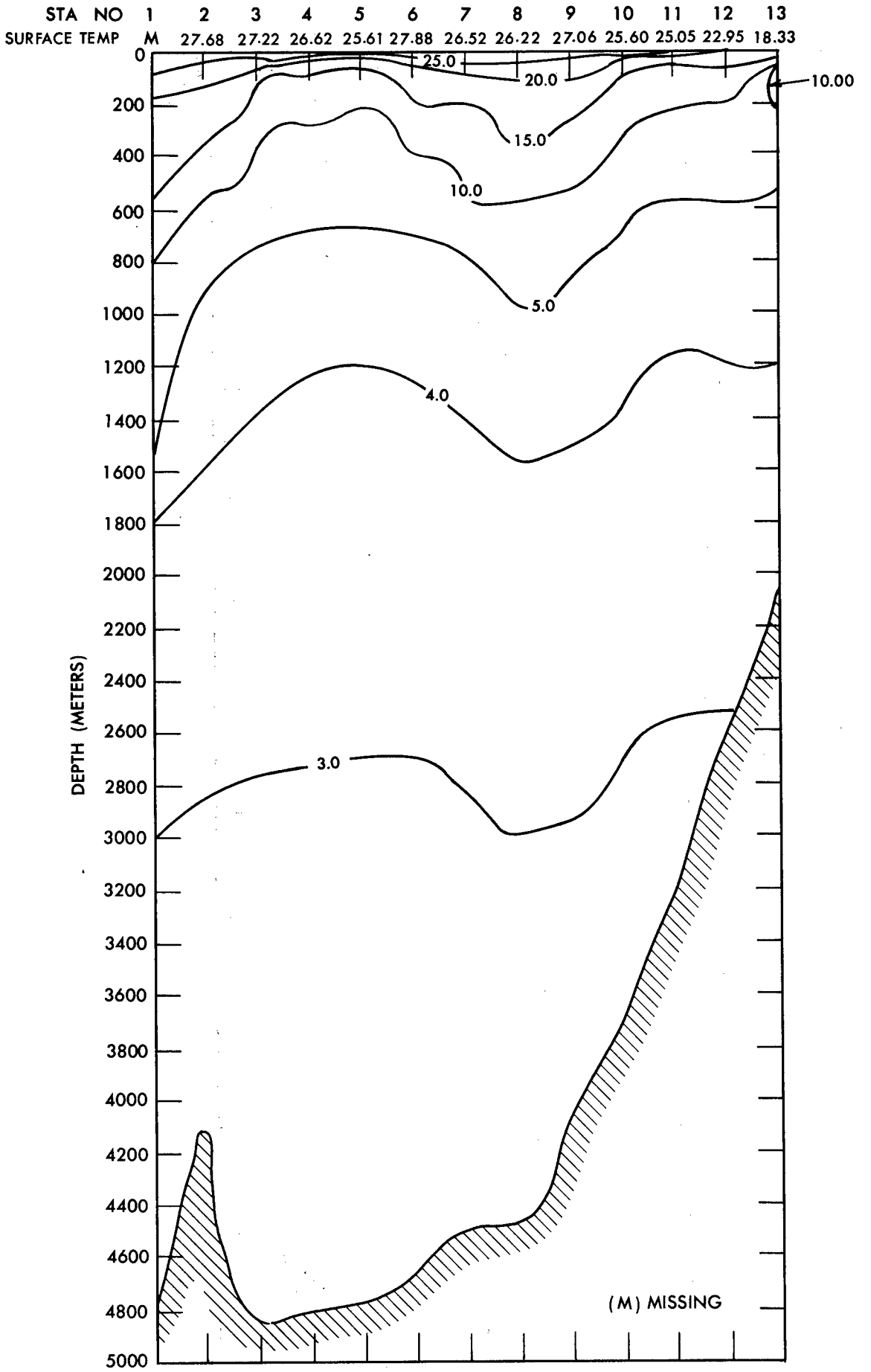

FIGURE 5 TEMPERATURE (°C) CROSS SECTION SOUTH TO NORTH 65°W

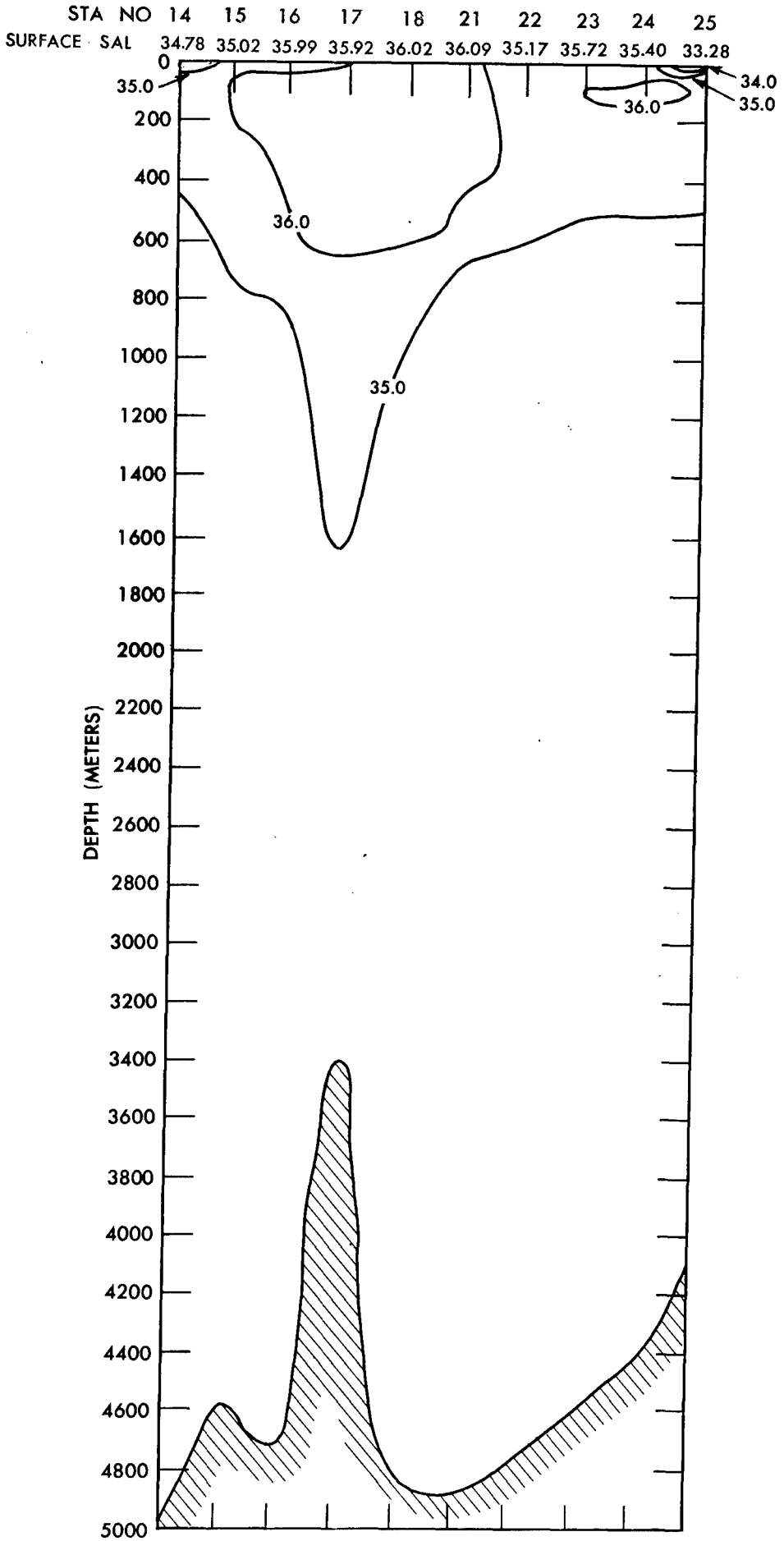

FIGURE 6 SALINITY (°/₀₀) CROSS SECTION SOUTH TO NORTH 60°30'W

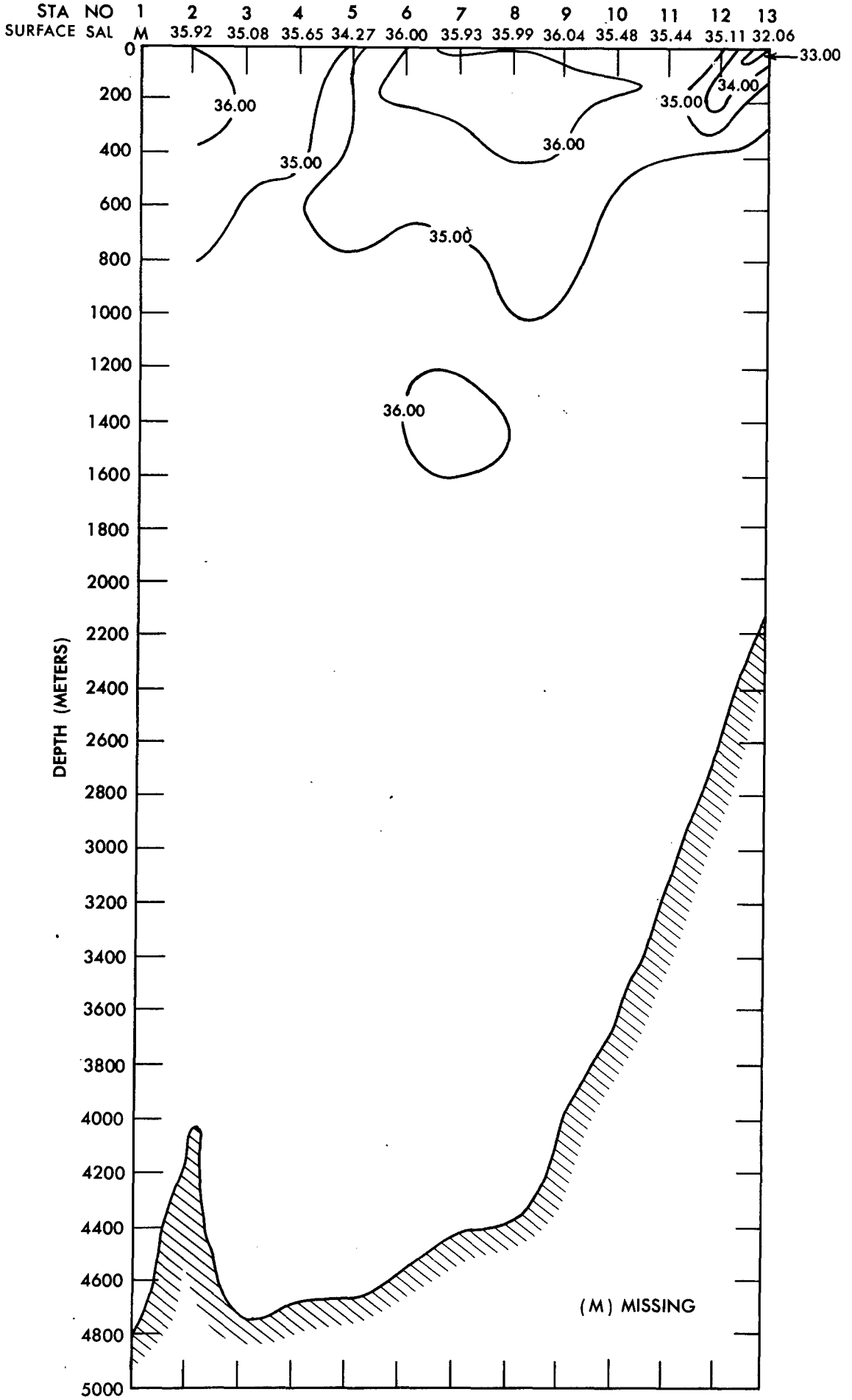

FIGURE 7 SALINITY(°/₀₀) CROSS SECTION SOUTH TO NORTH 65°W

TABLE 1

STATION DATA SUMMARY

STATION NUMBER	SONIC DEPTH METERS	CAST DEPTH	NO. OF TEMP/ SAL OBS	ANALYSIS FOR OXYGEN	ANALYSIS FOR NUTRIENTS	OBTAINED BT
1	4828	4255	12		X	X
2	4430	1912	23		X	X
3	4809	4267	23	X		X
4	4764	4396	24		X	X
5	4755	4424	24		X	X
6	4645	3883	24		X	X
7	4471	4260	24		X	X
8	4374	3676	24		X	X
9		3870	12	X	X	X
10	3658	3400	22		X	X
11	3163	3013	22		X	X
12	2583	2438	20	X	X	X
13	1984	1823	20		X	X
14	4983	4666	24	X	X	X
15	4572	836	12	X	X	X
16	4736	4001	24	X		X
17	3402	773	11	X	X	X
18	4860	4810	24	X	X	X
19	4842	3410	24	X	X	X
20	4846	3898	24	X	X	X
21	4892	4426	24	X	X	X
22	4795	1163	12	X	X	X
23	4608	4464	24	X	X	X
24	4484	1192	12	X	X	X
25	4068	3681	23	X	X	X

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This informal report is a summary of an oceanographic survey in an area 200 miles south of Nova Scotia during July and August 1968. Scientists from NAVOCEANO collected physical and chemical data from USNS LYNCH (T-AGOR 7).

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CHEMICAL OCEANOGRAPHY						
GULF STREAM						
NORTH ATLANTIC						
USNS LYNCH (T-AGOR 7)						